The Quantum View of the World

Transparencies

1. 3 views on observables as an ensemble
2. What does Measurement do?
2a How is this change brought about?
3. The Bell Experiment
4. The Bell Inequality
5. $C_{QM}(a,b)$ and $C_{classical}(a,b)$ with illustration
6. The Violation of the Bell Inequality by QM.
6a) The Four Correlation Experiments
7. Locality$_1$
8. Counterfactual Formulation
9. Problem with Counterfactual Formulation
10. Locality$_2$: not violated necessarily
11. No change in Statistical effects at a distance. (Locality$_5$)
12. Locality$_3$ and Locality$_4$

13. Conflict with Special Relativity.
14. The Connection with the EPR Argument.
15. The Kochen-Specker Paradox and Decoherence
16. Interaction of Physics and Philosophy.

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Brief Summary

I. P. Oct. 1980

1. D'Espagnat Quote.

2. Defn of Philosophy — Both example

3. Mereral epistemologist interpretation of QM (pragmatist or pragmatic)
5 min → - set of rules for predicting experimental results

4. Uncertainty relations

3 means of observables not in our language set

a) sharp unknown value

~~4 terms of~~

b) unsharp or fuzzy value

c) undefined or meaningless value

(1) QM not mysterious

QM mysterious - new concepts

QM mysterious limitations on applicability of old concepts.

3 means of what measurement does

(2) a) Pre-existing value revealed
b) Potential or latent result actualized
c) undefined value becomes defined

How is this change brought about?

(2a) a) Introduces word & physical interact
b) action of human consciousness.

10 min →

5. Shortcomings of Bell inequality. (3), (4), (5), (6), (6a), (7)

20 min →

6. Counterfactual formulation (8), (9), (10)

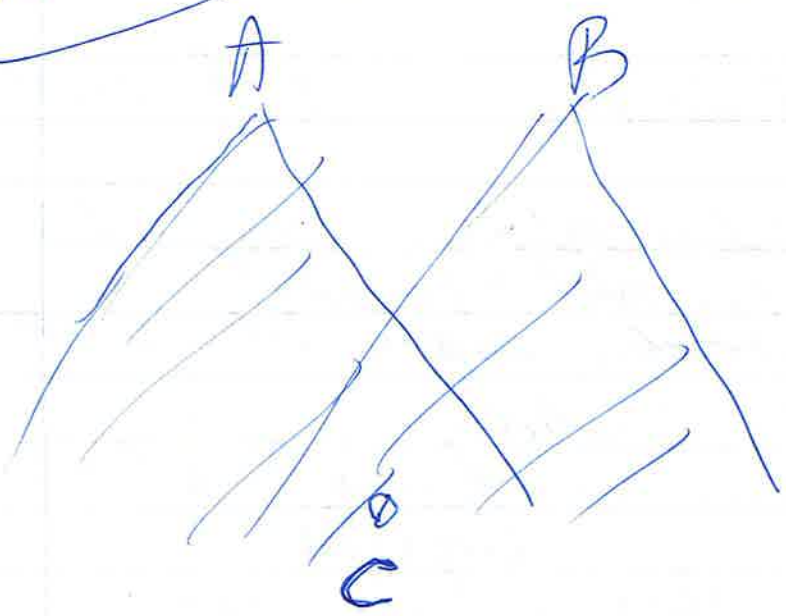
25 min →

7. No statistical effects produced at a distance — Tossing information at wrong location

30 min → (11)

8. violation of locality 3 is masked or at reality locality 4? (12)

Aspect Set



§9. Does ~~robot~~ Non-locality, 1,2,3 violate
35 min → Special relativity? (13)
— Aspect's Experiment —

§10 The role of human interests —
40 min → rebuttal & response

11. The Connection with the Kochen-Specker paradox (15)

12. The Connection with EPR argument (14)

13. The Interaction of Physics & Philosophy (16)

14. Final remark.

45 min →